

**Notice of Allowability**

Application No.

09/609,494

Examiner

Wei Zhen

Applicant(s)

DAS ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 4/29/2004.
2. ☒ The allowed claim(s) is/are 1-18,25-36,42-49 and 57-59.
3. ☒ The drawings filed on 30 June 2000 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |                                                                                                                     |                                                                                       |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)                                                    | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|                                                                                                                     | 9. <input type="checkbox"/> Other _____                                               |

1. This office action is in response to the amendment filed on 4/29/2004.
2. Claims 1-18, 25-36, 42-49, 57-59 are allowed.
3. Claims 19-24, 37-41, 50-56 have been canceled.

#### REASONS FOR ALLOWANCE

4. The cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a flow graph from the type graph so as to enhance context-sensitivity of flow analysis as recited in independent claims 1, 6; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a flow graph that includes a set of flow paths, wherein the set of flow paths excludes imprecise paths so as to enhance context-sensitivity of flow analysis as recited in independent claims 7, 12; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a plurality of instantiation paths to represent instantiations of generic types to instance types, wherein each instantiation path includes an index and a polarity as recited in independent claims 13, 18; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, solving the constraints to infer at least one type, wherein solving includes propagating polarities so as to enhance flow analysis as recited in independent claims 25, 30; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, tracing at least one path on a type graph having polarities to determine if a value arising at least one label in the program flow to another label in the program as recited in independent claims 31, 32; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, computing points-to

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information for at least one program point by answering reach ability queries on the type instantiation graph as recited in independent claims 33, 36; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming a subset from the set of flow paths such that context-sensitivity of flow analysis is enhanced as recited in independent claims 42, 49; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, abstracting includes unifying recursive types, wherein unifying is adapted to be executed using a cyclic unification technique as recited in independent claim 57; the cited prior arts taken alone or in combination fail to teach, in combination with other claimed limitations, forming at least one instantiation path between two nodes to represent an instantiation of a generic type to an instance type as recited in independent claim 58.

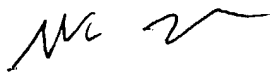
### *Conclusion*

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wei Zhen whose telephone number is 703-305-0437. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on 703-305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Wei Zhen  
Primary Examiner  
6/30/2004